California Energy Commission
Public Interest Energy Research (PIER) Program
ENVIRONMENTAL AREA RESEARCH

Geological Characterization of California's Offshore Carbon Dioxide Storage Capacity

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January 2012

Fact Sheet

The Issue

The California Energy Commission is supporting research to find greenhouse gas mitigation strategies appropriate for California. In parallel, the U.S. Department of Energy is funding carbon sequestration pilot studies to determine which technologies for permanently storing CO_2 in underground geologic formations are best suited for various regions in the United States.

An initial screening of California's onshore sedimentary basins showed tremendous potential for carbon dioxide storage. However, the initial characterization of California's sedimentary basins did not present a complete picture of the basin's potential for storage capacity.

Basins identified as having storage potential extend offshore onto the continental shelf, and these offshore sections constitute additional storage capacity. In some onshore basins the groundwater salinity approaches the Environmental Protection Agency's underground drinking water standards, which needs to be addressed in a more accurate estimate of storage capacity. Finally, the potential and capacity for carbon dioxide storage in gas fields, and the potential complexities attributed to hydrocarbon pool distributions, were not evaluated in the initial screening.

California offshore sedimentary basins (in green) have shown potential for carbon dioxide storage.
Graphic Source: California Geological Survey

Project Description

The California Geological Survey is transmitting data resulting from this project to the Utah Automated Geographic Reference Center, the clearinghouse and online map server for the various data generated by the West Coast Regional Carbon Sequestration Partnership.

The project's goals are to:

- Perform a preliminary geologic characterization of the carbon dioxide sequestration potential of California's offshore subsurface environment.

- Interpret and digitize sedimentary basin and oil and gas field outlines for California's offshore environment in a geographic information system (GIS).
- Identify, delineate, and provide capacity assessments for select hydrocarbon pools in gas reservoirs in the Southern Sacramento Basin, and analyze impacts on previous storage estimates.
- Determine the depth of saline water in previously studied formations and, if data warrants, modify previous estimates of carbon sequestration potential.
- For select formations previously studied in the Southern Sacramento Basin, estimate salinities from geophysical oil and gas well logs to produce generalized salinity maps. Formations of interest are those where total dissolved solids exceed 10,000 milligrams per liter, the Environmental Protection Agency threshold for underground sources of drinking water.

PIER Program Objectives and Anticipated Benefits for California

This project addresses several California state laws regarding climate change through the following actions: by helping to reduce greenhouse gas emissions to 1990 levels by 2020; by developing cost-effective long-term geologic sequestration of industrial carbon dioxide, which will help meet the state mandate that long-term contracts to purchase electricity from baseload facilities meet the state's greenhouse gas emission performance standard; and by helping to develop strategies to achieve California's greenhouse gas reduction and adaptation plans for climate change.

Project Specifics

Contract Number: 500-08-021
Contractor: California Department of Conservation
City/County: Sacramento, Sacramento County
Application: Regional
Amount: $274,067
Term: April 2009 to September 2011

For more information, please contact:

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